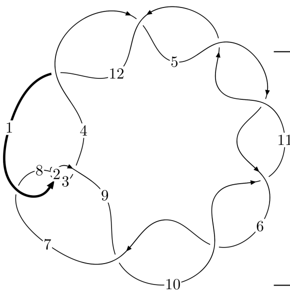
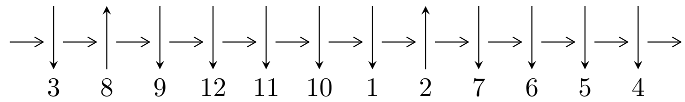
# $12a_{0745}$ ($K12a_{0745}$)



A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

$$6{,}11 \xrightarrow[c_5]{} 5 \xrightarrow[c_{11}]{} 12 \xrightarrow[c_4]{} 4 \xrightarrow[c_{12}]{} 1 \xrightarrow[c_{10}]{} 10 \xrightarrow[c_6]{} 7 \xrightarrow[c_7]{} 8 \xrightarrow[c_9]{} 9 \xrightarrow[c_3]{} 3 \xrightarrow[c_2]{} 2 \gg c_1, c_8$$

**Ideals for irreducible components[2] of $X_{\textbf{par}}$**

$$I_1^u = \langle u^{29} - u^{28} + \cdots + u + 1 \rangle$$

* 1 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 29 representations.

[1] The image of knot diagram is generated by the software "**Draw programme**" developed by Andrew Bartholomew(`http://www.layer8.co.uk/maths/draw/index.htm#Running-draw`), where we modified some parts for our purpose(`https://github.com/CATsTAILs/LinksPainter`).

[2] All coefficients of polynomials are rational numbers. But the coefficients are sometimes approximated in decimal forms when there is not enough margin.

## I. $I_1^u = \langle u^{29} - u^{28} + \cdots + u + 1 \rangle$

**(i) Arc colorings**

$$a_6 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^2 + 1 \\ -u^4 - 2u^2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -u^3 - 2u \\ u^5 + 3u^3 + u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} u \\ u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} u^2 + 1 \\ u^2 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u^{10} - 7u^8 - 16u^6 - 13u^4 - u^2 + 1 \\ u^{12} + 8u^{10} + 22u^8 + 24u^6 + 9u^4 + 2u^2 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} u^3 + 2u \\ u^3 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^{10} - 7u^8 - 16u^6 - 13u^4 - u^2 + 1 \\ -u^{10} - 6u^8 - 11u^6 - 8u^4 - 3u^2 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -u^{25} - 18u^{23} + \cdots + 4u^3 - 3u \\ -u^{25} - 17u^{23} + \cdots + 6u^3 + u \end{pmatrix}$$

**(ii) Obstruction class** $= -1$

**(iii) Cusp Shapes**
$= 4u^{27} - 4u^{26} + 84u^{25} - 80u^{24} + 772u^{23} - 696u^{22} + 4080u^{21} - 3456u^{20} + 13704u^{19} - 10804u^{18} + 30524u^{17} - 22128u^{16} + 45668u^{15} - 29956u^{14} + 45508u^{13} - 26404u^{12} + 29320u^{11} - 14528u^{10} + 11444u^9 - 4548u^8 + 2216u^7 - 600u^6 - 40u^5 + 40u^4 - 80u^3 + 12u^2 - 8u - 6$

**(iv) u-Polynomials at the component**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{29}+15u^{28}+\cdots-u-1$ |
| $c_2,c_8$ | $u^{29}-u^{28}+\cdots-u+1$ |
| $c_3,c_7$ | $u^{29}+u^{28}+\cdots+17u+13$ |
| $c_4,c_5,c_6$ $c_9,c_{10},c_{11}$ $c_{12}$ | $u^{29}-u^{28}+\cdots+u+1$ |

**(v) Riley Polynomials at the component**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{29} - y^{28} + \cdots + 15y - 1$ |
| $c_2, c_8$ | $y^{29} + 15y^{28} + \cdots - y - 1$ |
| $c_3, c_7$ | $y^{29} - 17y^{28} + \cdots - 413y - 169$ |
| $c_4, c_5, c_6$<br>$c_9, c_{10}, c_{11}$<br>$c_{12}$ | $y^{29} + 43y^{28} + \cdots - y - 1$ |

**(vi) Complex Volumes and Cusp Shapes**

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.086935+0.771881I$ | $2.65370+1.94307I$ | $0.30745-4.96256I$ |
| $u=-0.086935-0.771881I$ | $2.65370-1.94307I$ | $0.30745+4.96256I$ |
| $u=\ \ 0.343908+0.675511I$ | $-1.94705-6.69256I$ | $-6.07203+8.22032I$ |
| $u=\ \ 0.343908-0.675511I$ | $-1.94705+6.69256I$ | $-6.07203-8.22032I$ |
| $u=\ \ 0.117032+1.271630I$ | $3.27147-0.27468I$ | $-5.60472+0.I$ |
| $u=\ \ 0.117032-1.271630I$ | $3.27147+0.27468I$ | $-5.60472+0.I$ |
| $u=-0.275093+0.647551I$ | $0.83720+2.24471I$ | $-2.33349-5.12953I$ |
| $u=-0.275093-0.647551I$ | $0.83720-2.24471I$ | $-2.33349+5.12953I$ |
| $u=-0.118947+1.334990I$ | $7.41974+3.62310I$ | $-0.42057-2.79694I$ |
| $u=-0.118947-1.334990I$ | $7.41974-3.62310I$ | $-0.42057+2.79694I$ |
| $u=\ \ 0.153448+1.339520I$ | $4.70534-8.45308I$ | $-3.72441+6.33593I$ |
| $u=\ \ 0.153448-1.339520I$ | $4.70534+8.45308I$ | $-3.72441-6.33593I$ |
| $u=\ \ 0.343286+0.551515I$ | $-2.65978+1.25239I$ | $-7.88493+1.60855I$ |
| $u=\ \ 0.343286-0.551515I$ | $-2.65978-1.25239I$ | $-7.88493-1.60855I$ |
| $u=-0.027427+1.381600I$ | $9.86986+2.32396I$ | $0.90036-3.48123I$ |
| $u=-0.027427-1.381600I$ | $9.86986-2.32396I$ | $0.90036+3.48123I$ |
| $u=\ \ 0.476875+0.053551I$ | $-4.16020-3.97971I$ | $-12.35931+4.50350I$ |
| $u=\ \ 0.476875-0.053551I$ | $-4.16020+3.97971I$ | $-12.35931-4.50350I$ |
| $u=-0.400192$ | $-1.12072$ | $-10.0910$ |
| $u=-0.254330+0.235384I$ | $-0.470239+0.884635I$ | $-8.64771-7.43488I$ |
| $u=-0.254330-0.235384I$ | $-0.470239-0.884635I$ | $-8.64771+7.43488I$ |
| $u=\ \ 0.02575+1.81070I$ | $14.7006-0.9082I$ | 0 |
| $u=\ \ 0.02575-1.81070I$ | $14.7006+0.9082I$ | 0 |
| $u=-0.02952+1.82505I$ | $19.2009+4.3355I$ | 0 |
| $u=-0.02952-1.82505I$ | $19.2009-4.3355I$ | 0 |
| $u=\ \ 0.03812+1.82544I$ | $16.4863-9.3726I$ | 0 |
| $u=\ \ 0.03812-1.82544I$ | $16.4863+9.3726I$ | 0 |
| $u=-0.00607+1.83542I$ | $-17.5321+2.4840I$ | 0 |
| $u=-0.00607-1.83542I$ | $-17.5321-2.4840I$ | 0 |

## II. u-Polynomials

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{29} + 15u^{28} + \cdots - u - 1$ |
| $c_2, c_8$ | $u^{29} - u^{28} + \cdots - u + 1$ |
| $c_3, c_7$ | $u^{29} + u^{28} + \cdots + 17u + 13$ |
| $c_4, c_5, c_6$<br>$c_9, c_{10}, c_{11}$<br>$c_{12}$ | $u^{29} - u^{28} + \cdots + u + 1$ |

## III. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
| --- | --- |
| $c_1$ | $y^{29} - y^{28} + \cdots + 15y - 1$ |
| $c_2, c_8$ | $y^{29} + 15y^{28} + \cdots - y - 1$ |
| $c_3, c_7$ | $y^{29} - 17y^{28} + \cdots - 413y - 169$ |
| $c_4, c_5, c_6$ $c_9, c_{10}, c_{11}$ $c_{12}$ | $y^{29} + 43y^{28} + \cdots - y - 1$ |